Remarks

Claims 1-18, 21-23, 59-78, 80-81 and 99-112 are pending in the application. Claims 1, 23, and 59 have been amended. No new matter has been added by virtue of this amendment. Reconsideration of the application as amended is requested.

Claim Rejections--35 U.S.C. § 112, first paragraph

The Examiner rejects claims 1-18, 22-23, 59-81, and 99-102 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner states that "the applicants amended the claims to recite the specific orientation of the side of the substrate, which has a conductive film thereon. Such is not supported by the original disclosure." The Examiner also states, "The applicants amended the claims to recite substrates comprising conductive films. Such is not supported by the parent application."

First, Applicant has amended claims 1, 23, and 59 to change "conductive" to "metallic." Support for metallic is in the parent application, as originally filed. Support is also found in the provisional patent application 60/104,131 filed on October 14, 1998, which is the first priority date of the application:

> This invention relates generally to surface cleaning of substrates, such as semiconductor wafers, flat panel display glass, hard disk drives and heads, etc., in order to remove particulate and chemical contaminants. In particular, **it applies to cleaning of** oxide, **metallic** or polymer films following planarization (Chemical Mechanical Polishing, CMP) and polishing processes (60/104,131 provisional, page 1 lines 5-8).

Second, the 60/104,131 provisional patent application provides support for the orientation of the transducer and substrate being parallel and facing the surface to be cleaned:

> 1. A method for megasonic cleaning of individual substrates consists of a megasonic transducer, having each transducer area between 40% and 100% of the area of the individual substrate to be cleaned. **The substrate is positioned parallel to the transducer and spaced apart by a predetermined distance**. A liquid is flowing between the substrate and the transducer, while applying megasonic energy at a frequency of 400kHz (provisional application 60/104,131, page 3, 4th paragraph).

FIGS. 2 and 3 of the 60/104,131 provisional patent application illustrate a transducer oriented parallel to the wafer and the arrows extending from the transducer to the wafer show that the transducer is operating on the side of the wafer facing the transducer. FIGS. 2 and 3 also illustrate the wafer located within sidewalls and below a pair of overflows.

Applicant would respectfully ask the Examiner to consider that the 60/104,131 provisional patent application states that the application applies to cleaning of oxide, metallic or polymer films and that it describes and illustrates the transducer oriented parallel to and spaced apart from the surface of the substrate being cleaned.

Thus, the 60/104,131 provisional patent application includes support for the idea in claim 1(c):

1(c). providing a single substrate having a side that includes a metallic film, and disposing said single substrate in said container within said sidewalls and below said overflows for single-substrate processing, wherein said side is facing, substantially parallel to, and spaced a first spacing from said first active surface. (Claim 1(c), as amended)

Claims 23 and 59 have been similarly amended.

Thus, the rejection of claims 1-18, 22-23, 59-81, and 99-102 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement has been traversed.

Claim Rejections--35 U.S.C. § 103(a)

The Examiner rejects claims 1-18, 22-23, 59-78, 80-81, and 99-112 under 35 U.S.C. § 103(a), as being unpatentable over Kanno (6199567) in view of WO 01/08200 and Matsushita (5071776).

As the Examiner notes, Kanno does not teach or suggest the apparatus as claimed. The Examiner then states that the use of apparatuses with overflow and transducers parallel to both sides of the wafer for cleaning the wafers were known in the art as evidenced by WO 01/08200 and Matsushita.

Applicant would first respectfully ask the Examiner to consider that with respect to the independent claims, as amended, applicants claim priority of parent application 09/655, 038 which was filed on September 5, 2000, which was a continuation of PCT US99/02686 filed August 2, 1999 which claimed priority of US provisional application

60/104,131 filed October 14, 1998.

WO 01/08200 has a later effective date than the 60/104,131 application.

As described herein above, support for all elements in the three independent claims, as amended, is found in the 60/104,131 application. Thus, WO 01/08200 should be removed as a reference with respect to all three of the independent claims, as amended.

In addition, as the Examiner acknowledges, WO 01/08200 does not teach or suggest the limits of claim 1 (a) "at least **two** sidewalls having an overflow," and (b) "flowing said fluid upwardly in said container from said container inlet, through said first spacing, and over said **overflows**."

The Examiner points out that it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art so it would have been obvious to provide a second overflow in WO 01/08200. Applicant would respectfully ask the Examiner to consider that while it might normally be obvious to duplicate the overflow, the single overflow in the WO 01/08200 patent appears to be controlled by **adjustable** edge 44. Adjustability is important to the WO 01/08200 patent. Further invention would be needed to provide common adjustment to two adjustable edges so that fluid would flow over both overflows after an adjustment. Having two adjustable overflows would provide a maintenance headache, and further invention would be needed to provide simultaneous adjustment. Thus, duplication of the essential working parts of the device of the WO 01/08200 patent would not involve only routine skill in the art.

None of the references teach or suggest any reason to go to the trouble or expense of providing two adjustable overflows. It was applicant who suggested reason for providing two overflows.

While Matsushita teaches ultra-pure water input 11 or a pair of ultra-pure water inputs 11-1, 11-2 and a pair of overflow outflows on two sides of bath 10 for the embodiments of FIGS. 2 and 6, these embodiments both have a row of wafers oriented **perpendicular** to the active surface of the ultrasonic wave generator. These embodiments do not have wafers "substantially parallel to, and spaced a first spacing from said first active surface," as provided in claim 1, as amended.

Nor do any of Matsushita's embodiments have the "single wafer processing" of claim 1, as amended.

In particular, Matsushita teaches a stack of wafers oriented parallel to the ultrasonic wave generator in FIGS. 8 and 9. The cross sectional views in those figures show reflection plate 22 covering the top surface and show no overflow past that reflection

plate at all. The purpose of reflection plate 22 is to provide reflection of sound waves so as to achieve standing waves in the tank. These standing waves are needed in Matsushita to provide the backside damage on all wafers in the stack simultaneously.

As indicated by the dotted lines in FIGS. 8 and 9, Matsushita has the side of the wafers he is applying the damaging energy to facing the ultrasonic wave generator. That is the back side of the wafer, the side that does **not** have a metal film. Thus, Matsushita does not teach or suggest the limit of claim 1, as amended, "providing a single substrate having **a side that includes a metallic film**, and disposing said single substrate in said container within said sidewalls and below said overflows for single-substrate processing, **wherein said side is facing**, substantially parallel to, and spaced a first spacing from **said first active surface**.

Matsushita's arrangement takes advantage of multiple nodes in the standing waves to provide multi-wafer processing. Matsushita's whole point is multi-wafer processing. The standing waves would not be needed for single-wafer processing since the energy of the ultrasonic wave generator in that case could be directed directly at the one surface to be damaged. Thus, it would not be obvious to replace Matsushita's scheme with "single-substrate processing," as provided in claim 1, as amended.

In the Response to Arguments, the Examiner states that applicant's argument that Matsushita does not teach overflow for the embodiments of FIGS. 8 and 9 is not persuasive because Matsushita teaches the two overflows in other embodiments. Applicant believes that providing openings for overflows in reflection plate 22 would reduce the effectiveness of reflection plate 22 to reflect sound waves and reduce the intensity of the standing waves available for damaging the backside of the wafer. Thus, it would not be obvious to apply the teachings in the other embodiments to the embodiments of FIGS. 8 and 9.

Furthermore, Matsushita teaches an alternative to the overflows of FIGS. 2 and 6 in FIG. 11A. There Matsushita teaches providing ultra-pure water supply port 31 and discharge port 32. Thus, the pair of overflows of FIGS. 2 and 6 have been eliminated.

Thus, Matsushita teaches overflows in embodiments that do not have a wafer parallel to his ultrasonic wave generator and Matsushita appears to teach alternatives to overflows in the embodiments with a stack of wafers parallel to the ultrasonic wave generator. Thus, Matsushita does not teach or suggest the limit of claim 1, "wherein at least two of said sidewalls have an overflow."

The Examiner notes that the claims are written using language "comprising." Thereby, the claims do not exclude providing additional substrates. Applicant would respectfully ask the Examiner to consider that claims 1, 23, and 59 have been amended to specify single wafer processing. Support for this amendment is in the parent application

and in provisional patent application 60/104,131 filed October 14, 1998.

Therefore the rejections of claims 1, 23, and 59, and claims dependent thereon, under 35 U.S.C. § 103(a), as being unpatentable over Kanno in view of WO 01/08200 and Matsushita has been traversed.

It is believed that the claims are in condition for allowance. Therefore, applicant respectfully requests favorable reconsideration. If there are any questions please call applicant's agent at 802 864-1575.

Respectfully submitted,
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